§2. Problems and Concerns Regarding Access Control System Construction in Radiation Facilities

Kawano, T.

Based on our construction experience of an access control system at the National Institute for Fusion Science, problems related to software and operational design of the system were inspected. And some concerns regarding the construction and use of the system in radiation facilities were also inspected. As a result, the problems and concerns were broadly classified in three categories; system construction, system control, and operational condition and exceptional cases. Each category was further classified in several small categories as described in the follow.

1. Category-1: System construction

In the construction of an access control system, building structure, devices used in the building, and contents of work must be examined. Those will, for example, determine the type of the entrance gate that should be employed and the location where the entrance gate should be installed. The first category of system construction is further classified into four small categories, and each small category contains several items as shown in Table 1.

Table 1 System construction

(1) Structural feature of a building
① Number of entrances under access control
② Number of zones over watched independently each other
(2) Contents of work done in the controlled area.
① Feature of equipments under access control
② Contents of work in the controlled area
(3) Necessary functions demanded to an access control system
① Gate control, ② Access record, ③ Monitoring of shielding door open or closed, ④ Interlock signal operation system, ⑤ Information service of access control
(4) Selection of respective devices
① Recognition of respective persons, ② Entrance gate, ③ Recording of access and operation data, ④ Interlock signal control, ⑤ Information service, ⑥ System-breakdown and emergency measure

2. Category-2: System control

It largely depend on not only a system construction but also a controlling manner of the system whether an access control system is actually proper or not in the facilities. The second category of system control is concerned with the controlling manner, and further classified into five small categories, which contain several items as shown in Table 2.

Table 2 System control

(1) Personnel data registration
① Contents of registered personnel data, ② Registration methods, ③ Structure and format of data, ④ Effectiveness of registered data, ⑤ Maintenance of data
(2) Device control
① Initialization of the system data, ② Entrance gate control ③ Shielding door operation, ④ Interlock signal operation, ⑤ Control in cases of system-breakdown and emergency
(3) Data resulted from system operation
① Access data, ② Shielding door operation, ③ Interlock signal operation, ④ Data management at the change of the day, ⑤ Error treatment
(4) Data handling
① Live data-handling, ② Exist data-handling, ③ Data renewal at the change of the fiscal year, ④ Data backup
(5) Use of data and information service
① Contents of use, ② Method of use, ③ Document and reports

3. Category-3: Operational condition and exceptional cases

An access control system cannot always control absolutely personnel access under all situations. That is, it is necessary to consider the conditions of system operation and exceptional cases beyond the control of the system as shown in Table 3.

Table 3 Operational condition and exceptional cases

(1) Conditions of system operation
① Entering into the controlled area
② Usage of an ID card
③ Manual control
(2) Exceptional cases
① Visitor
② Operation in a case of system breakdown
③ Urgent countermeasure

Owing to the classifications shown in Tables 1, 2 and 3, a lot of problems and concerns became clear. Typical ones are individual registration, turnstile control, interlock signal control, data aggregate and transactions, automatic and manual control, and breakdown and emergency procedures. For example, to mention only a few in relation to the turnstile control, the gate-opening time interval, unlocking control of a turn bar, and access error handling will be concretely listed.

It is though that the present study has been completed at least for the first step. We will carry on this study of the system construction aiming further completion..